launch of indigenous, second generation INSAT-7A, INSAT-2B, INSAT-2C and INSAT-2D satellites, beginning with the launch of INSAT-2A in June 1992. The work on third generation INSAT will be slated to ensure continuity of services beyond 2000 AD. Continuation of satellite aided search and rescue programme and introduction of mobile satellite services are also envisaged. Dedicated satellite GRAMSAT series for rural development and eradication of rural illiteracy will be initiated during this period.

(2) *IRS System*

The operational services provided by IRS-1A/1B satellites, already in orbit, will be continued. The indigenous second generation IRS-1C and IRS-1D satellites are planned to be launched with better spectral and spatial resolution during the Plan period for new thrust areas of application. A microwave remote sensing programme is also contemplated to compliment IRS system.

(3) *Lunch Vehicles*

The ongoing ASLV programme will be continued with the flight planned in 1992 for the launch of stretched Rohini Satellite Series (SROSS) satellite in low earth orbit. Launching of PSLV for putting IRS class of satellites in sun-synchronous polar orbit is planned with the first launch of PSLV being slated to take place in 1992. Development of GSLV, capable of placing INSAT class payloads in geo-stationary orbit, is also planned.

(4) *Space Science*

Besides continuing space science related studies using the infrastructure/facilities such as Indian Middle Atmosphere Programme (IMAP), SROSS satellites, infrared telescope etc., plans are afoot to initiate monsoon and climate modeling and ground based experiment for modeling atmosphere studies. The Mesosphere, Stratosphere & Troposphere (MST) Radar facility which has been partially operationalised as per schedule will be fully operationalised in 1993. Geosphere, Biosphere programme is initiated to study global environmental issues.

(b) Successful launch of eight satellites, all of them indigenously designed and developed such as ARYABHATA, BHASKARA (2 satellites), ROHINI (2 satellites), Ariane Passenger Payload Experiment (APPLE), and the fully operational satellites IRS-1A and IRS-1B demonstrates country's capability. The ninth indigenous second generation satellite, INSAT 2 A, is ready for launch to meet the increasing requirements of the country's communication, TV broadcasting and meteorological data relay services.

In the creation of indigeous satellite launch capability, ISRO has already demonstrated through the Satellite Launch Vehicle-3 (SLV-3) Programme a capability to launch 50 kg class satellites successfully. Efforts are on to enhance the capability to 150 kg through the ASLV programme. Next launch of ASLV is planned in mid 1992. Parallelly, indigenous capability to launch IRS class satellites by the PSLV is progressing well and the first launch is expected in an year's time. Development of GSLV to launch INSAT-2 class satellites has just started and the first launch is expected by 1995-96.

Delay in launching of INSAT-2A

1378. DR. NARREDDY THULASI REDDY : Will the PRIME MINISTER be pleased to state:

(a) by when INSAT-2A is likely to be launched ; and

(b) what are the reasons for the delay in launching?

THE MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS (SHRIMATI MARGARET ALVA) : (a) INSAT-2A is now scheduled to be launched before the end of June 1992.

(b) INSAT-2A is to be launched by ARIANE-4 Launch Vehicle along with a satellite belonging to EUTELSAT Organisation in a dual launch configuration. Even though INSAT-2A is fully ready and tested EUTELSAT is able to ready its satellite for launch only by June 1992 and hence the three months delay. The launch date adjustments have to be made in order to find launch date suitable for both parties.

World position of science and technology manpower

1379. SHRI RAGHAVJI : Will the PRIME MINISTER be pleased to state:

(a) what is the world position of Science and Technology manpower of India in terms of number and quality in Department of Space;

(b) what efforts are being made to be in the forefront of these technologies;

(c) how does India's situation compare with U.S.A. Europe and Japan ; and

(d) what are the time bound programmes to cope up with these technologies?

THE MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS (SHRIMATI MARGARET ALVA) : (a) The S&T manpower of India in the area of Space is about 12000.

(b) and (c) The quality of Space manpower in India is considered excellent in view of the commendable achievements made with much lesser investment and manpower. Further Indian space efforts started much later than USA. Europe and Japan's entry into the space area. Yet the progress so far made by India in providing space based services for national development such as communication. TV. meteorology disaster warning remote sensing for mangement of national resources and enaironemt as well as design launch and operations of satellites compares well with the said countries. International community recognises India as world power in space technology.

(d) Department of Space has a well structured programme for the transformation of India into an advanced nation by the turn of the century by fully exploiting the potential of space technology and it occupies a commanding position in utilising space for national development particularly in the integrated sustainable development of the country and exploitation of national natural resources and in the areas of communication, broadcasting rural and developmental education meteorology and disaster management. In satellite technology India designed developed fabricated and successfully launched sveral satellites. It has already become completely. self-reliant in all aspects of remote sensing satellite technology with the launch and successful utilisation of Indian Remote Sensing Satellite-1A (IRS-1A) and Indian Remote Sensing Satellite-1B (IRS-1B), the state-of-art satellites resulting in enquiries from abroad for Indian assistance in satellite remote sensing technology. India has also indigenously built the second generation complex Indian National Satellite 2A (INSAT-2A) satellite which is ready for launch in 1992.